IN THE CLAIMS

1. (withdrawn from consideration) An optical amplifier comprising:

first and second optical amplifier units;

a variable optical attenuator optically coupled between the first and second optical amplifier units;

a first control unit to control gains of the first and second optical amplifier units based on an input of the first optical amplifier unit and an output of the second optical amplifier unit; and

a second control unit to control an attenuation quantity of the variable optical attenuator based on the input and an output of the first optical amplifier unit and an input and the output of the second optical amplifier unit.

2. (withdrawn from consideration) The optical amplifier as claimed in claim 1, further comprising:

first and second photodetectors to convert the input and the output of the first optical amplifier unit into electrical signals, respectively; and

third and fourth photodetectors to convert the input and the output of the second optical amplifier unit into electrical signals, respectively,

3. (withdrawn from consideration) The optical amplifier as claimed in claim 2, wherein the first control unit includes means for controlling the first and second optical amplifier units so that a level difference of the electrical signals output from the first and fourth photodetectors match a set value.

4. (withdrawn from consideration) The optical amplifier as claimed in claim 2, wherein the second control unit includes means for controlling the attenuation quantity of the variable optical attenuator so that a sum of a level difference between the electrical signals output from the first and second photodetectors and a level difference between the electrical signals output from the third and fourth photodetectors becomes constant.

5. **(currently amended)** An optical amplifier comprising:

an optical coupler to branch an input light;

a first ~~and second~~ optical amplifier units to amplify one of the branched light of the optical coupler;

a first variable optical attenuator to attenuate an output of the first optical amplifier unit;

a second optical amplifier unit to amplify an output light of the first variable optical attenuator;

a second variable optical attenuator to attenuate ~~an input of the first optical amplifier unit~~another branched light of the optical coupler;

a first control unit to control gains of the first and second optical amplifier units based on an output of the second variable optical attenuator and an output of the second optical amplifier unit; and

a second control unit to control attenuation quantities of the first and second variable optical attenuators based on the input and the output of the first optical amplifier unit and an input and the output of the second optical amplifier unit.

6. (original) The optical amplifier as claimed in claim 5, further comprising:

first and second photodetectors to convert the input and the output of the first optical amplifier unit into electrical signals;

a third photodetector to convert the output of the second variable optical attenuator into an electrical signal; and

fourth and fifth photodetectors to convert the input and the output of the second optical amplifier unit into electrical signals,

said third and fifth photodetectors supplying the electrical signals output therefrom to the first control unit,

said first, second, fourth and fifth photodetectors supplying the electrical signals output therefrom to the second control unit.

7. (withdrawn from consideration) An optical amplifier comprising:

first and second optical amplifier units;

a variable optical attenuator to attenuate an input and an output of the first optical amplifier unit;

a first control unit to control gains of the first and second optical amplifier units based on the input of the first optical amplifier unit which has been attenuated by the variable optical attenuator and an output of the second optical amplifier unit; and

a second control unit to control an attenuation quantity of the variable optical attenuator based on the input of the first optical amplifier unit, the input of the first optical amplifier unit which has been attenuated by the variable optical attenuator and the output of the second optical amplifier unit.

8. (withdrawn from consideration) The optical amplifier as claimed in claim 7, further comprising:

a first photodetector to convert the input of the first optical amplifier unit which has been attenuated by the variable optical attenuator into an electrical signal;

a second photodetector to convert the input of the first optical amplifier unit into an electrical signal; and

a third photodetector to convert the output of the second optical amplifier unit into an electrical signal,

said first and third photodetectors supplying the electrical signals output therefrom to the first control unit,

said first, second and third photodetectors supplying the electrical signals output therefrom to the second control unit.

9. (withdrawn from consideration) An optical amplifier comprising:

first and second optical amplifier units;

a first variable optical attenuator to attenuate an output of the first optical amplifier unit;

a second variable optical attenuator to attenuate an input of the first optical amplifier unit;

a first control unit to control gains of the first and second optical amplifier units based on an output of the second variable optical attenuator and an output of the second optical amplifier unit; and

a second control unit to control attenuation quantities of the first and second variable optical attenuators based on the output of the second variable optical attenuator, the output of the second optical amplifier unit and characteristics of the first and second variable optical attenuators.

10. (withdrawn from consideration) The optical amplifier as claimed in claim 9, further comprising:

a first photodetector to convert the output of the second variable optical attenuator into an electrical signal; and

a second photodetector to convert the output of the second optical amplifier unit into an electrical signal,

said first and second photodetectors supplying the electrical signals output therefrom to each of the first and second control units.

11. (withdrawn from consideration) An optical amplifier comprising:

first and second optical amplifier units;

a variable optical attenuator to attenuate an input and an output of the first optical amplifier unit;

a first control unit to control gains of the first and second optical amplifier units based on the input of the first optical amplifier unit which has been attenuated by the variable optical attenuator and an output of the second optical amplifier unit; and

a second control unit to control an attenuation quantity of the variable optical attenuator based on the input of the first optical amplifier unit which has been attenuated by the variable optical attenuator, the output of the second optical amplifier unit, and a characteristic of the variable optical attenuator.

12. (withdrawn from consideration) The optical amplifier as claimed in claim 11, further comprising:

a first photodetector to convert the input of the first optical amplifier unit which has been attenuated by the variable optical attenuator into an electrical signal; and

a second photodetector to convert the output of the second optical amplifier unit into an electrical signal,

said first and second photodetectors supplying the electrical signals output therefrom to each of the first and second control units.

13. (withdrawn from consideration) The optical amplifier as claimed in claim 1, wherein the first control unit controls the gains of the first and second optical amplifier units so that an output power of said optical amplifier becomes constant, and the second control unit controls the attenuation quantity of the variable optical attenuator so that a sum of the gains of the first and second optical amplifier units becomes constant.

14. (original) The optical amplifier as claimed in claim 5, wherein the first control unit controls the gains of the first and second optical amplifier units so that an output power of said optical amplifier becomes constant, and the second control unit controls the attenuation quantities of the first and second variable optical attenuators so that a sum of the gains of the first and second optical amplifier units becomes constant.

15. (withdrawn from consideration) The optical amplifier as claimed in claim 7, wherein the first control unit controls the gains of the first and second optical amplifier units so that an output power of said optical amplifier becomes constant, and the second control unit controls the attenuation quantity of the variable optical attenuator so that a sum of the gains of the first and second optical amplifier units becomes constant.

16. (withdrawn from consideration) The optical amplifier as claimed in claim 9, wherein the first control unit controls the gains of the first and second optical amplifier units so that an output power of said optical amplifier becomes constant, and the second control unit controls the attenuation quantities of the first and second variable optical attenuators so that a sum of the gains of the first and second optical amplifier units becomes constant.

17. (withdrawn from consideration) The optical amplifier as claimed in claim 11, wherein the first control unit controls the gains of the first and second optical amplifier units so that an output power of said optical amplifier becomes constant, and the second control unit controls the attenuation quantity of the variable optical attenuator so that a sum of the gains of the first and second optical amplifier units becomes constant.

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18. (withdrawn from consideration) The optical amplifier as claimed in claim 13, wherein:

each of the first and second optical amplifier units includes an optical amplifying medium and a pump light source to supply a pump light to the optical amplifying medium, and

the gain of each of the first and second optical amplifier units is controlled by an optical power of the pump light output from the pump light source thereof.

19. (original) The optical amplifier as claimed in claim 14, wherein:

each of the first and second optical amplifier units includes an optical amplifying medium and a pump light source to supply a pump light to the optical amplifying medium, and

the gain of each of the first and second optical amplifier units is controlled by an optical power of the pump light output from the pump light source thereof.

20. (withdrawn from consideration) The optical amplifier as claimed in claim 15, wherein:

each of the first and second optical amplifier units includes an optical amplifying medium and a pump light source to supply a pump light to the optical amplifying medium, and

the gain of each of the first and second optical amplifier units is controlled by an optical power of the pump light output from the pump light source thereof.

21. (withdrawn from consideration) The optical amplifier as claimed in claim 16, wherein:

each of the first and second optical amplifier units includes an optical amplifying medium and a pump light source to supply a pump light to the optical amplifying medium, and

the gain of each of the first and second optical amplifier units is controlled by an optical power of the pump light output from the pump light source thereof.

22. (withdrawn from consideration) The optical amplifier as claimed in claim 17, wherein:

each of the first and second optical amplifier units includes an optical amplifying medium and a pump light source to supply a pump light to the optical amplifying medium, and

the gain of each of the first and second optical amplifier units is controlled by an optical power of the pump light output from the pump light source thereof.

23. (withdrawn from consideration) An optical amplifier control method for controlling an optical amplifier having first and second optical amplifier units and a variable optical attenuator optically coupled between the first and second optical amplifier units, comprising:

controlling gains of the first and second optical amplifier units based on an input of the first optical amplifier unit and an output of the second optical amplifier unit; and

controlling an attenuation quantity of the variable optical attenuator based on the input and an output of the first optical amplifier unit and an input and the output of the second optical amplifier unit.

24. (withdrawn from consideration) The optical amplifier control method as claimed in claim 23, wherein:

the controlling gains controls the gains of the first and second optical amplifier units so that an output power of the optical amplifier becomes constant, and

the controlling an attenuation quantity controls the attenuation quantity of the variable optical attenuator so that a sum of the gains of the first and second optical amplifier units becomes constant.

25. (withdrawn from consideration) The optical amplifier control method as claimed in claim 24, wherein:

each of the first and second optical amplifier units includes an optical amplifying medium and a pump light source to supply a pump light to the optical amplifying medium, and

the controlling gains controls the gains of the first and second optical amplifier units based on an optical power of the pump light output from the pump light source of each of the first and second optical amplifier units.

26. (withdrawn from consideration) The optical amplifier control method as claimed in claim 23, further comprising:

converting the input and the output of the first optical amplifier unit into firs and second electrical signals, respectively; and

converting the input and the output of the second optical amplifier unit into third and fourth electrical signals, respectively,

the controlling gains includes being supplied with the first and fourth electrical signals,

the controlling an attenuation quantity includes being supplied with the first through fourth electrical signals.

27. (withdrawn from consideration) The optical amplifier control method as claimed in claim 26, wherein the controlling gains includes controlling the first and second optical amplifier units so that a level difference between the first and fourth electrical signals match a set value.

28. (withdrawn from consideration) The optical amplifier control method as claimed in claim 26, wherein the controlling an attenuation quantity includes controlling the attenuation quantity of the variable optical attenuator so that a sum of a level difference between the first and second electrical signals and a level difference between the third and fourth electrical signals becomes constant.

29. **(currently amended)** An optical amplifier control method for controlling an optical amplifier having ~~first and second optical amplifier units~~an optical coupler to branch an input light, an optical amplifier unit to amplify one of the branched light of the optical coupler, a first variable optical attenuator to attenuate an output of the first optical amplifier unit, a second optical amplifier to amplify an output light of the first variable optical attenuator, and a second variable optical attenuator to attenuate ~~an input of the first optical amplifier unit~~another branched light of the optical coupler, comprising:

controlling gains of the first and second optical amplifier units based on an output of the second variable optical attenuator and an output of the second optical amplifier unit; and

controlling attenuation quantities of the first and second variable optical attenuators based on the input and the output of the first optical amplifier unit and an input and the output of the second optical amplifier unit.

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30. (withdrawn from consideration) An optical amplifier control method for controlling an optical amplifier having first and second optical amplifier units and a variable optical attenuator to attenuate an input and an output of the first optical amplifier unit, comprising:

controlling gains of the first and second optical amplifier units based on the input of the first optical amplifier unit which has been attenuated by the variable optical attenuator and an output of the second optical amplifier unit; and

controlling an attenuation quantity of the variable optical attenuator based on the input of the first optical amplifier unit, the input of the first optical amplifier unit which has been attenuated by the variable optical attenuator and the output of the second optical amplifier unit.

31. (withdrawn from consideration) An optical amplifier control method for controlling an optical amplifier having first and second optical amplifier units, a first variable optical attenuator to attenuate an output of the first optical amplifier unit and a second variable optical attenuator to attenuate an input of the first optical amplifier unit, comprising:

controlling gains of the first and second optical amplifier units based on an output of the second variable optical attenuator and an output of the second optical amplifier unit; and

controlling attenuation quantities of the first and second variable optical attenuators based on the output of the second variable optical attenuator, the output of the second optical amplifier unit and characteristics of the first and second variable optical attenuators.

32. (withdrawn from consideration) An optical amplifier control method for controlling an optical amplifier having first and second optical amplifier units and a variable optical attenuator to attenuate an input and an output of the first optical amplifier unit, comprising:

controlling gains of the first and second optical amplifier units based on the input of the